

### **REMARKS**

Applicant thanks the Examiner for the careful consideration given the present application and for the courtesies extended during the telephonic interview conducted on January 8, 2008. The application has been carefully reviewed in light of the Office Action and in light of the Advisory Action, and amended above to more clearly and particularly describe the subject matter which applicant regards as the invention.

In the Office Action mailed September 25, 2007, claims 1, 2, 14-16, and 18 were rejected under 35 USC § 102(e) as being anticipated by US Patent No. 6,665,684 to Zait, et al. Further in that Action, claims 3-6, 8, 9, 11, and 12 were rejected under 35 USC § 103(a) as being unpatentable over Zait in view of US Patent No. 6,965,891 to Jakobsson, et al. Still further in that action, claims 7 and 10 were rejected under 35 USC § 103(a) as being unpatentable over Zait in view of Jakobsson and further in view of US Patent No. 5,664,172 to Antoshenkov. Yet further in that action, claims 13, 17, 19, and 20 were rejected under 35 USC § 103(a) as being unpatentable over Zait in view of US Patent No. 6,014,656 to Hallmark, et al. The Action was made final.

Applicant replied to the final Office Action on November 26, 2007 and the Examiner responded with an Advisory Action.

### **THE NON-ART REJECTIONS**

It is to be noted that claims 1-18 were previously rejected in the initial Office Action of May 23, 2007 under 35 USC § 101 as being directed to non-statutory

subject matter. That rejection was not applied or reiterated by the Examiner in either the Office Action of September 25, 2007 or in the recent Advisory Action and, accordingly, applicant considers it to be removed.

All claims are therefore allowable under 35 USC § 101.

### **THE ART REJECTIONS**

As noted above, claims 1, 2, 14-16, and 18 were rejected under 35 USC § 102(e) as being anticipated by Zait, and remaining claims 3-13, 17, 19, and 20 were rejected under 35 USC § 103(a) as being obvious in view of various prior art teachings. Those rejections are respectfully traversed as set out in detail below.

#### **All Claims Are Patentable Over Zait, et al.:**

The Office Action asserts as to claim 1 that the Zait '684 patent teaches a method comprising: fragmenting a database into a plurality of database fragments using at least one fragmentation expression, the at least one fragmentation expression specifying a content of one of the plurality of database fragments, the fragmentation expression including: a boolean combination of one or more comparison-predicates, wherein each comparison-predicate: defines a range of a fragmentation dimension basis function of one or more database fields; processing a database query against the database fragments of the database based on the boolean combination of the one or more comparison-predicates; and providing results of the processing to a user of the database.

Applicant respectfully traverses the Examiner's rejections of the claims and, particularly with regard to the anticipation rejection in connection with the Zait '684

patent. Applicant does not concede that the Zait '684 patent teaches fragmenting a database into a plurality of database fragments using at least one fragmentation expression as set out in independent claim 1 of the present application. More particularly, the method of claim 1 includes limitations of fragmenting a database into database fragments, processing a database query against the database fragments, and providing results of the processing to a user of the database. The fragmenting includes fragmenting the database into a plurality of database fragments using at least one fragmentation expression, the at least one fragmentation expression specifying a content of one of the plurality of database fragments. The fragmentation expression includes: a boolean combination of one or more comparison-predicates, wherein each comparison-predicate: defines a range of a fragmentation dimension basis function of one or more database fields. The processing includes processing a database query against the database fragments of the database, based on the boolean combination of the one or more comparison-predicates. The providing includes providing results of the processing to a user of the database. In claim 1, each comparison-predicate defines a range of a function, the recited function being a fragmentation dimension basis function. Also, the fragmentation expression is a Boolean combination of one or more comparison-predicates. Similar limitations are included in each of independent claims 14 and 19 as well.

The Examiner cites to the Zait '684 patent at column 1, lines 38-67 in the Office Action. At the top of page 3 of the action, the Examiner equates the "boolean combination of one or more comparison-predicates" recited in claim 1 of the present application as being the comparisons "values less than to\_date (yy-mm-dd, '94-04-

01')" set out at the bottom of column 1 of the Zait patent. However, independent claim 1 recites "the fragmentation expression including: a boolean combination of one or more comparison-predicates, wherein each comparison-predicate: defines a range of a fragmentation dimension basis function of one or more database fields." Although applicant does not concede equivalence, the "values less than ..." cited by the Examiner might be considered to represent a boolean combination of one or more comparison-predicates wherein each comparison predicate defines a range within one or more database fields but, it is respectfully submitted, does not define a range of a fragmentation dimension basis function of one or more database fields.

It is respectfully submitted that the Zait '684 patent does not teach a fragmentation dimension basis function of one or more database fields. The Examiner has taken the position in the Office Action that the example listed in Zait is a fragmentation dimension basis function because, according to the Examiner, it is part of the function "partition" and it defines the range of the dimension basis (values less than to\_date). However, independent claim 1, recites that the fragmentation dimension basis function is a function of one or more database fields. In addition, the fragmentation dimension basis function itself has a range as set out in independent claim 1. As is well known in the mathematical arts, functions express dependence between two quantities, one of which is given by the independent variable argument to the function (its input) and the other is produced as a dependent variable value of the function (its output). The collection of all acceptable inputs of a function is typically called its domain whereas the set of all resulting outputs is typically called the "range" of the function. In independent claim 1, each

comparison-predicate defines a range of a fragmentation dimension basis function, the function being of one or more database fields.

In contradistinction thereto, the "comparison-predicates" of the type "partition... values less than..." cited by the Examiner simply define, at most, a range of one or more database fields rather than defining a range of a function (a fragmentation basis function) of one or more database fields.

Overall, therefore, applicant respectfully submits that although the example shown at the bottom of column 1 of the Zait '684 patent might show a "comparison-predicate" defining a range of one or more database fields, it falls short of teaching a comparison-predicate defining a range of a fragmentation dimension basis function of one or more database fields. This is clearly set out in independent claims 1, 14, and 19 of the present application.

Still further, the Examiner took the position in the Advisory Action that, with regard to Zait,

it is noted that the partition function of Zait et al. (see 1:38-67), accepts as input 'values less than to\_date (yy-mm-dd, '94-04-01),' and so on. The data is a database field. Therefore, the partition function of Zait, et al is a 'fragmentation expression' that 'corresponds to one of the plurality of database fragments', and the boolean comparison that serves to tell the fragmentation expression the range of the fragment 'defines a range of fragmentation dimension basis function of one or more database fields'. As the partition function corresponds to the date field, and the resulting partition is composed of data organized by the date field, it is a 'fragmentation dimension basis function of one or more database fields.'

The Examiner cited to the pseudo code presented in Zait in column 1. However, that code does not show i) fragmentation dimension basis functions; ii) that each comparison-predicate defines a range of a fragmentation basis function of one or more database fields; and that iii) the fragmentation expression includes a boolean combination of one or more comparison predicates. In the exemplary embodiment presented in the present application, the at least one fragmentation expression is illustrated as  $[(f_1 > k) \text{ AND } (f_2 > k_2) \text{ OR } (f_3 < k)]$ , which is "a boolean combination of one or more comparison-predicates"  $(f_1 > k)$ ,  $(f_2 > k_2)$ ,  $(f_3 < k)$ , and wherein "each comparison-predicate defines a range of a fragmentation basis function" such as  $f_1$ ,  $f_2$ , or  $f_3$ . As can be seen, the pseudo code cited to by the Examiner does not teach or suggest these features and, particularly, does not show this "nested" hierarchy as set out in the claims of the present application, specifically, independent claim 1.

In addition to the above, independent claim 14 recites a fragmented database comprising a fragmentation scheme and a plurality of database fragments. The fragmentation scheme includes i) one or more fragmentation dimension basis functions wherein each fragmentation dimension basis function depends upon one or more database fields, and ii) a plurality of fragmentation expressions, each fragmentation expression being defined by: a boolean combination of comparison-predicates, wherein each comparison-predicate: defines a range of at least one of the fragmentation dimension basis functions. Again, although the Zait '684 patent might teach a "comparison-predicate" which defines a range of one or more database fields which applicant does not concede, it falls short of teaching a comparison-predicate defining a range of one of the fragmentation dimension basis

functions, the functions depending upon one or more of the database fields. It is respectfully submitted that this limitation is set out in independent claim 14 of the present application.

Lastly, independent claim 19 recites a limitation for "program code for constructing a fragmented database having a fragmentation scheme constructed using fragmentation dimension basis functions, each fragmentation dimension basis function configured to compute a value based upon at least one database field" and a limitation for "program code for inserting a new record into the fragmented database, the inserting including (i) computing values of the fragmentation dimension basis functions using the at least one database field of the new record, (ii) selecting a target database fragment based on the fragmentation scheme and the computed values of the fragmentation dimension basis functions, and (iii) inserting the new record into the target database fragment." In claim 19, the fragmentation scheme is defined by a boolean combination of comparison-predicates, in which each comparison-predicate defines a range of selected ones of said fragmentation dimension basis function. Each of the recited limitations recites fragmentation based on computed values of fragmentation dimension basis functions similar to the above-described features of independent claim 1. This method of fragmentation is neither taught nor fairly suggested by the range-based and hash-based fragmentation schemes described in the Zait '684 patent. Again, the fragmentation scheme recited in claim 19 determines fragments based on the range of computed output values of a basis function rather than one the range of values of the database field itself as described in the Zait '684 patent. Also, again, the fragmentation scheme is defined by a boolean combination of comparison-predicates, in which

each comparison-predicate defines a range of selected ones of said fragmentation dimension basis function. As previously discussed above with reference to claims 1 and 14, the Zait '684 patent appears to not discuss any functions other than hash functions which are unlike those of the basis functions described in the present application.

Applicant reiterates each of the arguments set forth previously with regard to the secondary references of Jakobsson, Antoshenkov, and Hallmark.

Thus, for at least the above reasons, it is respectfully submitted that each of independent claims 1, 14, and 19 and claims 2-13, 15-18, and 20 dependent therefrom, respectively, are patentably distinct over the Zait '684 patent alone or in combination with any of the other secondary references cited and applied by the Examiner.

#### **REQUEST FOR INTERVIEW**

Applicant again respectfully requests that the Examiner grant an interview with applicant's representative identified below in order to best expedite prosecution of this application in the event that any formal or informal matters remain after the instant response is entered into the record and considered.



### **CONCLUSION**

In view of the above comments and arguments presented, applicant respectfully submits that all pending claims (claims 1-20) are patentably distinct and unobvious over the art of record.

Allowance of all pending claims and early notice to that effect is respectfully requested.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 09-0460, our Order No. IBM-17577.

Respectfully submitted,

RANKIN, HILL & CLARK LLP

By /Michael E. Hudzinski/  
Michael E. Hudzinski, Reg. No. 34185

38210 Glenn Avenue  
Willoughby, Ohio 44094-7808  
(216) 566-9700